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09/589,881	06/09/2000	Jeongmin Moon	3430-0105P	1734

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Birch Stewart Kolasch & Birch LLP
P O Box 747
Falls Church, VA 22040-0747

EXAMINER	
NGUYEN, HOAN C	

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/589,881
Filing Date: June 09, 2000
Appellant(s): MOON, JEONGMIN

JAMES T. ELLER Jr.
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed June 01, 2005 appealing from the Office action mailed September 23, 2004.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

No evidence is relied upon by the examiner in the rejection of the claims under appeal.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-4, 6-9, 11 and 14-21, 23 and 24 are rejected under 35 U.S.C. 102(e) as being anticipated by Shinji et al. (US6259854B1).

In regard to claims 1 and 2, Shinji et al. (Figs. 1 a-15b) disclose an auxiliary light source device comprising:

- a light source 1;
- a light reflecting member (reflector 4) which guides light from the light source into the light directing member,
- a light directing member 3 for directing incident light from the light source toward the reflector, with this structure of the light directing member 3, the

light ray L4 can be outwardly along an orthogonal direction if L4 strikes the convex portion at different angle (see **Appendix below**).

- the light directing member including
    - o a lower surface having a plurality of convex portions extending from the lower surface, each of the convex portions having a substantially planar surface which is substantially parallel to the lower surface, and an angle between the lower surface and a surface connecting the planar surface of the convex portion is about 90° since slope angle δ =0° or 2° (col. 7 lines 5-6).

wherein light reflected along an orthogonal direction L2/L3 to the liquid crystal display device is uniform (to emit primary light inputted from the side end plane of the light guide uniformly, in abstract and col. 1 lines 27-28) according to Figs. 5 (δ =0°) or Fig. 6 (δ =2°) or Fig. 7 (δ =5°).

In regard to claims 21 and 24, Shinji et al. (Figs. 1 a-1 5b) disclose an auxiliary light source device comprising:

- a light source 1 extending along a width of the reflector to emit light along a length of the reflector 4;
- a light directing device 3 located above the reflector 4 and adjacent to the light source to direct light from the light source to the reflector such that a light distribution of light directed by the light directing device is substantially uniform along the length of the reflector, and such that the directed light is substantially perpendicular to the reflector;

- the light-directing device 3 includes a plurality of portions extending toward the reflector at a 90° angle such that the light reflected along an orthogonal direction L2/L3 to the liquid crystal display device is uniform (to emit primary light inputted from the side end plane of the light guide uniformly, in abstract and col. 1 lines 27-28) according to Figs. 5 (δ =0°) or Fig. 6 (δ =2°) or Fig. 7 (δ =5°), spacing between the portions decreasing along the length of the reflector with increasing distance from the light source. With this structure of the light directing member 3, the light ray L4 can be outwardly along an orthogonal direction if L4 strikes the convex portion at different angle (see **Appendix below**).

In regard to claims 11 and 14, Shinji et al. (Figs. 1a-15b) disclose an auxiliary light source device comprising :

- an upper reflective surface to reflect impinging light above a certain incidence angle; Example see in Fig. 2, upper reflective surface is 3c.
- a lower reflective surface 3a having a plurality of convex portions extending toward the reflector to direct light from the auxiliary light source device to the reflector outwardly along an orthogonal direction; with this structure of the light directing member 3, the light ray L4 can be outwardly along an orthogonal direction if L4 strikes the convex portion at different angle (see **Appendix below**).
- an entry surface facing to the light source 1 connecting the upper and lower reflective surfaces through which light from a light source enters,

- each convex portion includes a planar portion and sides connecting the planar portion with the lower reflective surface, and an angle between the lower surface and the sides is about 90° since slope angle δ =0° or 2° (col. 7 lines 5-6) or 5° (col. 6 lines 62).
- light reflected along an orthogonal direction L2/L3 to the liquid crystal display device is uniform (to emit primary light inputted from the side end plane of the light guide uniformly, in abstract and col. 1 lines 27-28) according to Figs. 5 (δ =0°) or Fig. 6 (δ =2°) or Fig. 7 (δ =5°).
- a planar portion is substantially parallel to the lower reflective surface.

In regard to claims 3 and 19, Shinji et al. (Figs. 1b-1g and 15b) disclose an auxiliary light source device, wherein spacing between the convex portions decreases with increasing distance from the light source as shown in a graph of Fig. 15b.

In regard to claims 4, 20 and 23, Shinji et al. (Fig. 15a) disclose the spacing between adjacent convex portions of lower surface of the light-directing member is 100μm (Fig. 15a) that is in a range of 10μm to 1000μm and a width W of each portion is from 20μm to 200μm, which covers a width less than 100μm (abstract).

In regard to claims 6 and 15, Shinji et al. (Fig. 1 b) disclose the planar surface of each convex portion has a cross-section of substantially circular shape (Fig. 1 b).

In regard to claims 7 and 16, Shinji et al. (Fig. If) disclose the planar surface of each convex portion has a cross section of rectangular shape (Fig. 11f),

In regard to claims 8 and 17, Shinji et al. (Fig. 1 d or 1 g) disclose the plane surface of the plurality of convex portions has a bar shape extending perpendicular to a direction of light propagation in the light directing member 11 and along substantially an entire width of the reflective LCID device.

In regard to claim 9, Shinji et al. (Fig. 15b) disclose (Table 1) a distance/height between the lower surface and the planar surface of each convex portion is 12μm and 20μm that is less than 50μm.

In regard to claim 18, Shinji et a]. (Fig. 15b) disclose a plurality of convex portion extending from the lower surface to ensure an uniform distribution of light along a length of the device (in abstract).

> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 10 is rejected under 35 U.S.C. 102(b) as being anticipated by Funamoto et al. (EP 08878720A) in applicant's IDS.

Funamoto et al. teach (Fig. 10, third embodiment, page 8 line 53 to page9 line 35) a reflective liquid crystal display device, comprising:

- a display panel 102 inherently including two substrates spaced apart, liquid crystal sandwiched between the two substrates, and
- a reflector 103 to reflect light through the liquid crystal;
- an auxiliary light source device for supplying light to the display panel, including,
    - a light source 2,
    - a light directing member (light guide plate 11) for directing incident light from the light source toward the display panel, the directing member having a lower surface having a plurality of convex portions, each having a substantially planar surface which is substantially parallel to the lower surface, an angle between the lower surface and a surface connecting the planar surface of the convex portion being about 90°, wherein light reflected along an orthogonal direction to the display panel is uniform which is inherent with this structure of convex portions at surface of light directing member (light guide plate 11),
- a light reflecting member which guides light from the light source into the light directing member, said display panel being between said auxiliary light source and said light reflecting member.

(10) Response to Argument

Rejection of Claims 1-4, 6-9, 11, 14-21, 23 and 24

as being anticipated by Shinji et al. (U.S. Patent 6,259,854).

Applicant's ONLY arguments are follows:

A. Shinji does not teach that the light is uniform when the angle between the lower surface and a surface connecting the planar surface of the convex portion is about 90°.

B. The question then becomes whether this suggested light ray could inherently be present. Applicants submit that is not even a possible situation. At the top of Figure 4, there is a diagram showing five light beams at different angles. Next to the five arrows is a designation Θ_c= 47.8°. This is a reference to column 6, line 46 where the critical angle of the light guide is given as Θ_c= 47.8°. The critical angle of any device is the angle at which light would be internally reflected rather than passing through the boundary strikes the surface CD at an Accordingly, any light beam angle greater than Θ_c= 47.8°, it will not be deflected downwardly as suggested by the Examiner, but would be reflected internally. Accordingly, the Examiner's suggestion that this light beam would be deflected straight downwardly toward the reflector is incorrect since it would instead be reflected internally. The Examiner has not shown any calculations for showing the angle. In view of the fact that the reference does not describe this situation, Applicants submit that the Examiner should be required to show why he thinks this particular angle will produce a light which is deflected downwardly and also why this angle should be less than the critical angle.

Examiner's responses to Applicants' ONLY arguments are follows:

A. Shinji does teach that the light is uniform (abstract) when the angle between the lower surface and a surface connecting the planar surface of the convex portion is about 90° as Figs. 3-6 shown.

B. Examiner uses Snell Laws with the boundary conditions of n_{PMMA}=1.49 of the light guider and n_{air}=1.00 as Fig. 4 shown. Based on Figure in **Appendix** below, Examiner will show that the particular angle Θ will produce a light which is deflected downwardly and this particular angle Θ should be less than the critical angle Θ_c= 47.8°.

$$n_{air} \sin\Theta_r = n_{PMMA}\sin\Theta_i \quad (1)$$

$$\Theta_i = \Theta-\delta \quad (2)$$

$$\Theta_r = 90-\delta \quad (3)$$

replacing (2) and (3) into (1):

$$(1.00)\sin(90-\delta) = (1.49)\sin(\Theta-\delta)$$

with δ=0° (an angle between the lower surface and a surface connecting the planar surface of the convex portion being 90°):

$$1/1.49 = \sin\Theta;$$

therefore, Θ=42.15° <Θ_c= 47.8° (not internal reflection).

with δ=2° (an angle between the lower surface and a surface connecting the planar surface of the convex portion being 88°):

$$\sin(88°)/1.49 = \sin(\Theta-2°);$$

therefore, $\Theta=44.12^\circ < \Theta_c = 47.8^\circ$ (not internal reflection).

This suggested light ray could inherently be present that the light ray is deflected downwardly toward the reflector.

Rejection of Claim 10 under 35 U.S.C. 102 as anticipated by Funamoto et al. (EP 0 887 8720).

Applicant's ONLY arguments are follows:

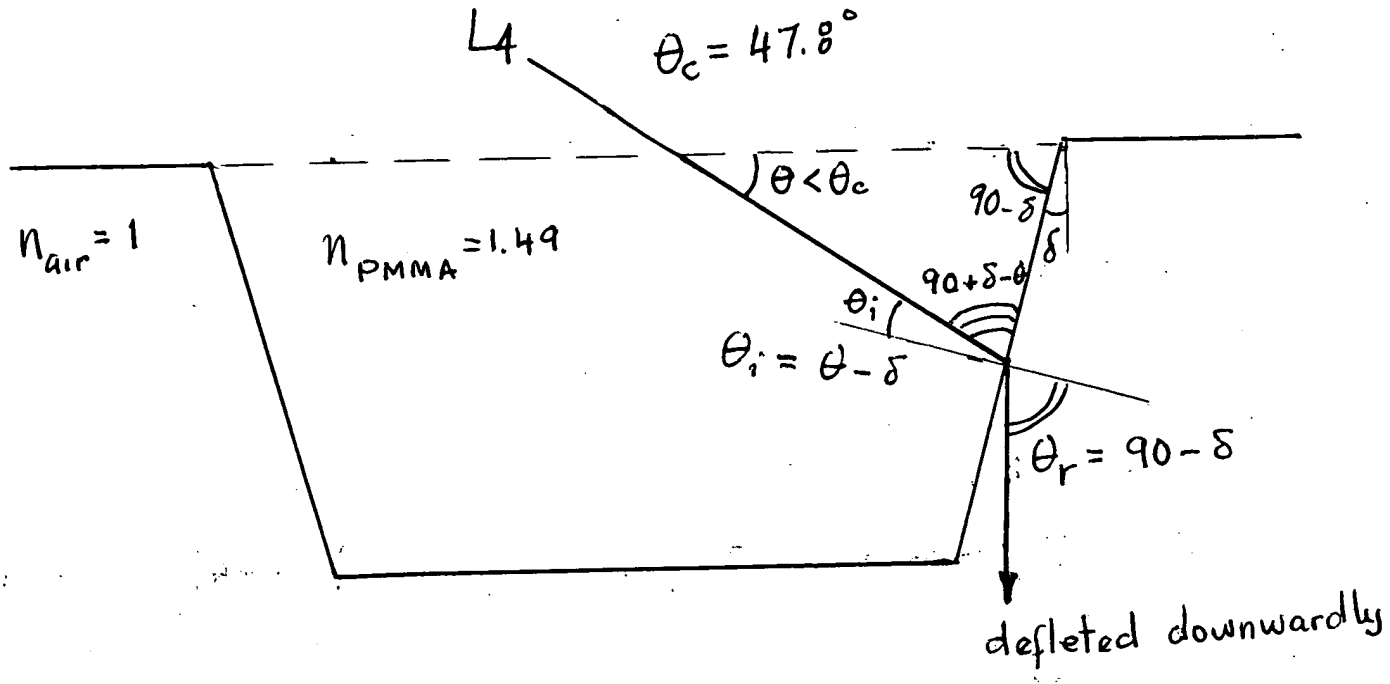
Funamoto et al. reference does not teach the present claimed invention. In particular, it is noted that the display panel is described in the claim as including two substrates, liquid crystal sandwiched between the two substrates and a reflector. Thus, the reflector is one part of the display panel. Thus, in the claimed invention the reflector is included in the display panel while in the reference the reflector is a separate part and not included in the display panel.

Examiner's responses to Applicants' ONLY arguments are follows:

The features of "the reflector is included in the display panel" and "the reflector is one part of the display panel" do not recite in claim 10. There is also no drawing to illustrate these features in detail. Therefore, the argument is irrelevant.

Besides, Funamoto et al. teach (Fig. 10) the display panel 102/103 including a liquid crystal cell 102 and a reflector 103; therefore, "the reflector is included in the display panel" and "the reflector is one part of the display panel".

(11) Related Proceeding(s) Appendix



For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Hoan C. Nguyen

July 19, 2005

Conferees:

Robert Kim

Darren Schuberg

ROBERT H. KIM
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800